

REMARKS/ARGUMENTS

Reconsideration and allowance of the above identified application is respectfully requested in light of the above amendments and the following remarks.

The claimed invention is directed to a method for detecting defects, in a non-contacting manner, on shot cores and core packets used in the foundry industry. By way of background, as part of the casting of mold parts, it is conventional to first form shot cores which are formed as separate pieces and then joined together to form a casting mold or a core packet. These core packets are then filled with molten metal to cast the finished product.

Shot cores and core packets of the described type tend to have defects, especially along their edges, which are thus imparted to the cast products. The cast products require substantial cooling time before they can be measured and inspected by conventional contact procedures, and should there be a defect in a shot core or core packet, a large number of cast parts would be produced before the defect could be detected. The present invention effectively alleviates this problem by providing an efficient and reliable system for detecting defects in the shot cores or core packets before they are placed in production.

In carrying out the method, the articles being analyzed are illuminated by at least two light sources, emanating from different directions, and a camera is used for recording each article and the shadows resulting from the illumination. The recorded data is processed in a computer, where the recorded image is compared with a record of reference data.

As an important feature of the claimed invention, the light sources are positioned so as to produce shadows which magnify an area of each shot core or core packet. Also, the

processing of the recorded data includes processing a recorded image which includes the magnifying shadows. With this arrangement, it is possible to perform a more detailed examination of critical areas of the article than could be achieved by an examination of only the article itself. This novel feature is further discussed at page 5, lines 1-15 of the specification.

In rejecting the claims in the latest Official Action, the Examiner has proposed a combination of the teachings of Tabatabaci '506 and Pöhlandt '681. Tabatabaci discloses a system for the accurate positioning of molds with respect to the pouring vessel 34 in a molten metal pouring operation. To detect the position of the molds 16, a notch 14 is formed on the side of each mold, and the notch is detected by an image sensor 10 which may be a video camera or a digital image detector. Light is provided by two light sources 18 (note Fig. 1) which are aimed at the notches so as to cause a shadow to be cast which provides a "dark shape representation of the shape of the notch" (column 2, lines 44-46). The signal from the image sensor is converted to pixels (if not initially provided by the sensor) and the processed signal is sent to a central processor 22 where it is analyzed by comparing the detected location of the notch image with a predetermined notch location stored in a memory (column 2, lines 65-67). The difference value is sent to a position controller 26 which controls the movement of the pouring vessel 34.

The Examiner has looked to the teachings of Pöhlandt for a teaching of a process for detecting defects in shot cores or core packets used in the foundry industry. Pöhlandt discloses the use of cameras 5 to create optical images of foundry cores 3 for quality control measurements. However, there is no suggestion in the references themselves as to why a revision

of the mold positioning system of Tabatabaci to incorporate the teachings of Pöhlandt would be desirable.

In addition, and significantly, the two references do not teach an important feature of the present invention, even when the two references are considered collectively. Specifically, neither reference teaches or suggests the feature of using magnified shadow images of critical areas of each article which need to be carefully checked for accuracy during a quality control analysis.

In the latest Official Action the Examiner has taken the position that the shadows as disclosed by Tabatabaci would "inherently" be magnified. There is no basis for this contention in the reference itself, and certainly there is no recognition in the reference of the important advantages achieved by employing such magnification as noted above. Thus it cannot be said that the magnification feature would have been taught or suggested by the cited references.

For the above reasons, the proposed combination of Tabatabaci and Pöhlandt does not teach or suggest the invention as set forth in base Claims 30 and 45. It is accordingly submitted that these claims, along with their dependent Claims 31-34, 36-40, 42, and 46-47 are in condition for immediate allowance, and such action is solicited.

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Page 8

Respectfully submitted,



Charles B. Elderkin
Registration No. 24,357

Customer No. 00826

ALSTON & BIRD LLP

Bank of America Plaza

101 South Tryon Street, Suite 4000

Charlotte, NC 28280-4000

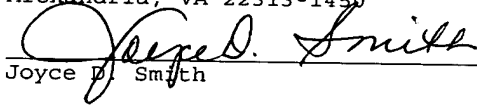
Tel Charlotte Office (704) 444-1000

Fax Charlotte Office (704) 444-1111

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Joyce D. Smith